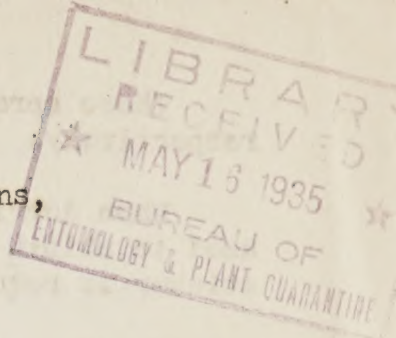


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CONTROL OF THE MEXICAN BEAN BEETLE IN VIRGINIA

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For several years the Mexican bean beetle has caused heavy losses in Virginia and adjoining states. Growers of beans must be prepared to combat this pest if normal crop yields are to be harvested.

It should be borne in mind that, regardless of winter survival, the insect multiplies so rapidly that a heavy midsummer infestation may be bred up from a relatively light early spring infestation.

CULTURAL PRACTICES

In eastern Virginia emergence from hibernation usually begins during the first week of May, with the peak of emergence coming about May 15. By this time approximately 50 per cent of the emergence has usually occurred. Emergence from hibernation continues at a slower rate until about the middle of June, when the last of the overwintered beetles enter the fields.

It is thus apparent that in order to avoid the heaviest early-season infestation of overwintering adults, the spring crop of snap beans should be planted as early as weather conditions will permit. It is also obvious that beans planted about the first of May will receive the heaviest population of overwintered beetles and consequently the most serious early-season damage. The fall crop should be planted as late as possible. The beetle does not reproduce so rapidly late in August and September as in the spring and early summer.

Heavy bean beetle damage usually occurs during July, August, and part of September. Normally large acreages of Fordhook and Henderson bush lima beans are planted in July, following early potatoes, and are available for food for the beetles during these months. Careful attention should be given to controlling the beetles on these plantings, as usually the beetles bred up on the spring crop of snap beans are flying about in search of food at this time and young lima beans prove very attractive to them. These crops have a long growing season (being available for food for the beetle until frost); consequently a few untreated rows may be the source of many thousands of beetles which may spread to fall plantings of snap beans in the vicinity, or breed up large late-fall populations to enter hibernation.

PLOWING

The destruction of the crop remnants immediately after the field is picked or abandoned is as important as thorough spraying or dusting. The field should be plowed at least 6 inches deep, special effort being made to cover all the bean foliage. Under usual conditions a high percentage of all stages of the insect may be killed when thorough plowing is done.

ARTIFICIAL CONTROL

The Mexican bean beetle may be effectively controlled by the thorough application of one of the following dusts or sprays:

Sprays

Derris (finely ground root), 4 per cent rotenone content:

2 or 2 1/2 pounds to 50 gallons of water, or

2 or 2 1/2 ounces to 3 gallons of water

These sprays have a rotenone content of approximately 0.020 and 0.025 per cent, respectively.

When derris contains a higher rotenone content, less of the material may be used to obtain sprays of the rotenone content mentioned above. No spreader or sticker is required.

Derris powder does not readily mix with water. In preparing small quantities (2 or 3 gallons) the derris root powder should be placed in about a quart of water and vigorously stirred until all of the material has become suspended in the water. This should then be poured into the sprayer (through the strainer), and any residue on the strainer should be washed through with the remainder of the water. In case a compressed-air sprayer is used in applying the material, the sprayer should be shaken at frequent intervals so that the material may be constantly agitated. In preparing larger quantities (50 to 100 gallons) the required amount of derris root powder should be placed in a bucket containing about 3 gallons of water and stirred vigorously until the material has become suspended in the water. After running about half of the required amount of water into the sprayer, start the agitator and pour the derris root water mixture into the sprayer. Then add the remainder of the water.

In preparing derris root sprays the grower should be positive that he is using derris root containing 4 or 5 per cent rotenone, and not one of the commercial ready-mixed derris dusts containing 0.50 to 0.75 per cent rotenone, as the latter would not have the proper rotenone content for use as a spray and are entirely unsuitable for this purpose.

Cryolite: 3 pounds to 50 gallons of water, or
3 ounces to 3 gallons of water

To prepare the spray mixture, weigh the proper quantity of cryolite, then mix it with a small quantity of water, and wash it through a fine strainer into the spray tank to prevent clogging of nozzles.

Cryolite should not be applied to snap beans after pods have begun to form.

Magnesium Arsenate: 2 pounds to 50 gallons of water, or
2 ounces to 3 gallons of water

This material is still the most economical insecticide for the control of the Mexican bean beetle, but recent experiments indicate that better results and greater yields may be obtained with derris or cryolite. Also, in recent years a brand of magnesium arsenate has been sold which seriously injures bean foliage. In view of these facts, derris or cryolite is now recommended in preference to magnesium arsenate. Growers who are unable to obtain derris or cryolite may profitably continue the use of magnesium arsenate, provided they are able to obtain the same brand that has given satisfactory results in the past.

Dusts

Ground derris root with a carrier used as a dust has given very promising results. The general conclusion from a large number of applications is that a dust should contain from 0.50 to 0.75 per cent of rotenone. The rotenone content of the finished mixed dust of course depends on the amount of diluent used as well as on the percentage of rotenone in the derris. Insecticide companies now sell high-grade finely ground derris powder of specified rotenone content by blending the various analyzed batches.

To prepare a dust containing 0.50 per cent rotenone, use the following formula:

Derris powder (4 per cent rotenone content)	12 $\frac{1}{2}$ lbs.
Talc, or other diluent	87 $\frac{1}{2}$ lbs.

To prepare a dust containing 0.75 per cent rotenone, use the following formula:

Derris powder (4 per cent rotenone content)	18 $\frac{3}{4}$ lbs.
Talc, or other diluent	81 $\frac{1}{4}$ lbs.

If the rotenone content of the derris is greater or less than 4 per cent, then the proportions of the inert diluent must be varied accordingly. For instance, if a derris powder containing 5 per cent rotenone is used, 10 pounds of this and 90 pounds of diluent should be mixed to obtain a 0.50 per cent rotenone dust. If it is desired to make a 0.75 per cent rotenone dust from derris powder containing 5 per cent rotenone, 15 pounds of the 5 per cent derris powder should be mixed with 85 pounds of diluent.

Other diluents which may be used are infusorial earth, kaolin (China clay), dusting gypsum, wheat flour, or tobacco dust. Fine dusting sulphur may be mixed with the infusorial earth or clay to the extent of 25 pounds of sulphur substituted for a like amount of the earth or clay.

Commercial dusts containing from 0.50 to 0.75 per cent of rotenone may be obtained already mixed.

Cryolite and magnesium arsenate have not given as satisfactory results when used as dusts as when used as sprays, but at times cryolite has given good results when mixed with fine dusting sulphur, wheat flour, talc, or tobacco dust, at the rate of 60 pounds of cryolite to 40 pounds of the diluent.

Dusts are usually applied at dosages of 20 to 25 pounds per acre on bush beans, but when careful applications are made the dosage may sometimes be reduced.

Caution! Neither cryolite nor magnesium arsenate should be applied to snap beans after pods have begun to form.

Dust mixtures may be prepared on the farm by placing the ingredients in a steel drum together with several rocks about as large as the fist. The drum is then tightly closed and rolled about for a distance of 400 to 500 feet. At the same time it should be tipped on end at intervals of about 50 feet.

WHEN AND HOW TO APPLY THE MATERIALS

Effective control of the Mexican bean beetle depends upon thorough and timely treatments. The material should be so applied that it will reach the undersides of the leaves where the insect feeds.

Begin treatments when beetles are found in the field. If careful observations are made, treatments may be delayed until eggs of the beetles become numerous, that is, when an egg group may be found on each 10 feet of row, or when the beetles are present in sufficient numbers to cause noticeable foliage injury.

As the beans grow, the new foliage must be covered with the material; therefore, the treatment should be repeated at weekly or 10-day intervals, especially if the pest is abundant. One to three, sometimes four, applications are required, but as a rule two or three thorough applications will be sufficient on snap beans. Growers of lima beans for market must necessarily protect the crop over a longer period.

ADDITIONAL TESTS PLANNED During the season of 1935 the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture will continue control experiments, in cooperation with the Virginia Truck Experiment Station, at Norfolk and Onley, Virginia. In these tests a large number of materials will be compared.

